

# farrell

The goal of farrell is to provide an interactive interface to Data Envelopment Analysis modeling in R. The farrell package is built upon Benchmarking. The Github repository is available [here](#).

## Installation

You can install the development version of farrell with:

```
remotes::install_github("feddelegrand7/farrell")
```

## Examples

You can run:

```
library(farrell)

farrell()
```

or if you're working on RStudio, just click on **Addins** then **farrell**.

## Data Loading:

Hit **Browse...** to upload your data frame in a csv format. All the inputs and outputs must be contained within the uploaded data frame. Further, the data frame needs to contain an identification column in order to identify Decision Making Units distinctively. It can be a numeric or a character column.



In the following examples, we use the mtcars data frame which has been exported in a csv format with an additional column: **cars name**.

## Data Frame Overview

Load a csv file

Upload complete

cars name	mpg	cyl	disp	hp	drat	wt	qsec	vs	am	gear	carb
Mazda RX4	21.00	6	160.00	110	3.90	2.62	16.46	0	1	4	4
Mazda RX4 Wag	21.00	6	160.00	110	3.90	2.88	17.02	0	1	4	4
Datsun 710	22.80	4	108.00	93	3.85	2.32	18.61	1	1	4	1
Hornet 4 Drive	21.40	6	258.00	110	3.08	3.21	19.44	1	0	3	1
Hornet Sportabout	18.70	8	360.00	175	3.15	3.44	17.02	0	0	3	2
Valiant	18.10	6	225.00	105	2.76	3.46	20.22	1	0	3	1

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## Model Tuning

## Model Tuning

Select the Input Variables

- ☐ mpg
- ☐ cyl
- ☐ disp
- ☐ hp
- ☐ drat
- ☐ wt
- ☐ qsec
- ☐ vs
- ☐ am
- ☐ gear
- ☐ carb

Select the Output Variables

- ☐ mpg
- ☐ cyl
- ☐ disp
- ☐ hp
- ☐ drat
- ☐ wt
- ☐ qsec
- ☐ vs
- ☐ am
- ☐ gear
- ☐ carb

Select the Identification column

cars name

Select the Returns to Scale assumption

crs

Select the orientation

input

Calculate Efficiency

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Within the Model Tuning tab, you select the input and output variables and determine the identification column. Then you choose the Returns to Scale assumption (crs, vrs, irs, drs, add or fdh). After that, you determine the orientation of the model, whether input or output. Finally, hit **Calculate Efficiency** to get the results in the respective tabs.

Let's for example consider **mpg** and **disp** as the output variables and **wt** as input. We choose **cars name** as the identification column and execute an input-oriented model with Constant Returns to Scale.

## Model Tuning

**Select the Input Variables**

- ☐ mpg
- ☐ cyl
- ☐ disp
- ☐ hp
- ☐ drat
- ☒ wt
- ☐ qsec
- ☐ vs
- ☐ am
- ☐ gear
- ☐ carb

**Select the Output Variables**

- ☒ mpg
- ☐ cyl
- ☒ disp
- ☐ hp
- ☐ drat
- ☐ wt
- ☐ qsec
- ☐ vs
- ☐ am
- ☐ gear
- ☐ carb

**Select the Identification column**

cars name

**Select the Returns to Scale assumption**

crs

**Select the orientation**

input

Calculate Efficiency

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## Efficiency Results

The Efficiency Results tab displays the efficiency scores along with the peers for each unit in a descending order. You have the ability to download the result in a csv format. The tab also provides a summary of the distribution of the efficiency scores.

## Efficiency Results

Click on the download button to get a csv file of the results

download

**DEA Summary**

Summary of efficiencies

CRS technology and input orientated efficiency

Number of firms with efficiency==1 are 2 out of 32

Mean efficiency: 0.739

---

Eff range	#	%
0.5<= E <0.6	6	18.8
0.6<= E <0.7	7	21.9
0.7<= E <0.8	7	21.9
0.8<= E <0.9	5	15.6
0.9<= E <1	5	15.6
E ==1	2	6.2

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
0.5147	0.6206	0.7382	0.7392	0.8235	1.0000

Show 10 entries

Search:

	cars name	score	peer1	peer2
1	Lotus Europa	1.0000	Lotus Europa	
2	Ford Pantera L	1.0000	Ford Pantera L	
3	Hornet Sportabout	0.9633	Lotus Europa	Ford Pantera L
4	Pontiac Firebird	0.9473	Lotus Europa	Ford Pantera L
5	Honda Civic	0.9368	Lotus Europa	
6	Toyota Corolla	0.9195	Lotus Europa	
7	Duster 360	0.9107	Ford Pantera L	
8	Dodge Challenger	0.8243	Lotus Europa	Ford Pantera L
9	Camaro Z28	0.8232	Ford Pantera L	
10	Cadillac Fleetwood	0.8120	Ford Pantera L	

Showing 1 to 10 of 32 entries

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## Lambdas

In the Lambdas tab, you get the contribution of the peers to the inefficient units' score.



Slacks

Click on the download button to get a csv file of the results

download

Show 10 entries

Search:

	cars name	sum_slack	wt_slack	mpg_slack	disp_slack
1	Mazda RX4	0.0000	0.0000	0.0000	0.0000
2	Mazda RX4 Wag	0.0000	0.0000	0.0000	0.0000
3	Datsun 710	0.0000	0.0000	0.0000	0.0000
4	Hornet 4 Drive	0.0000	0.0000	0.0000	0.0000
5	Hornet Sportabout	0.0000	0.0000	0.0000	0.0000
6	Valliant	0.0000	0.0000	0.0000	0.0000
7	Duster 360	1.9051	0.0000	1.9051	0.0000
8	Merc 240D	0.0000	0.0000	0.0000	0.0000
9	Merc 230	0.0000	0.0000	0.0000	0.0000
10	Merc 280	0.0000	0.0000	0.0000	0.0000

Showing 1 to 10 of 32 entries

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## Code of Conduct

Please note that the farrell project is released with a Contributor Code of Conduct. By contributing to this project, you agree to abide by its terms.

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